Canada Mortgage and Housing Corporation
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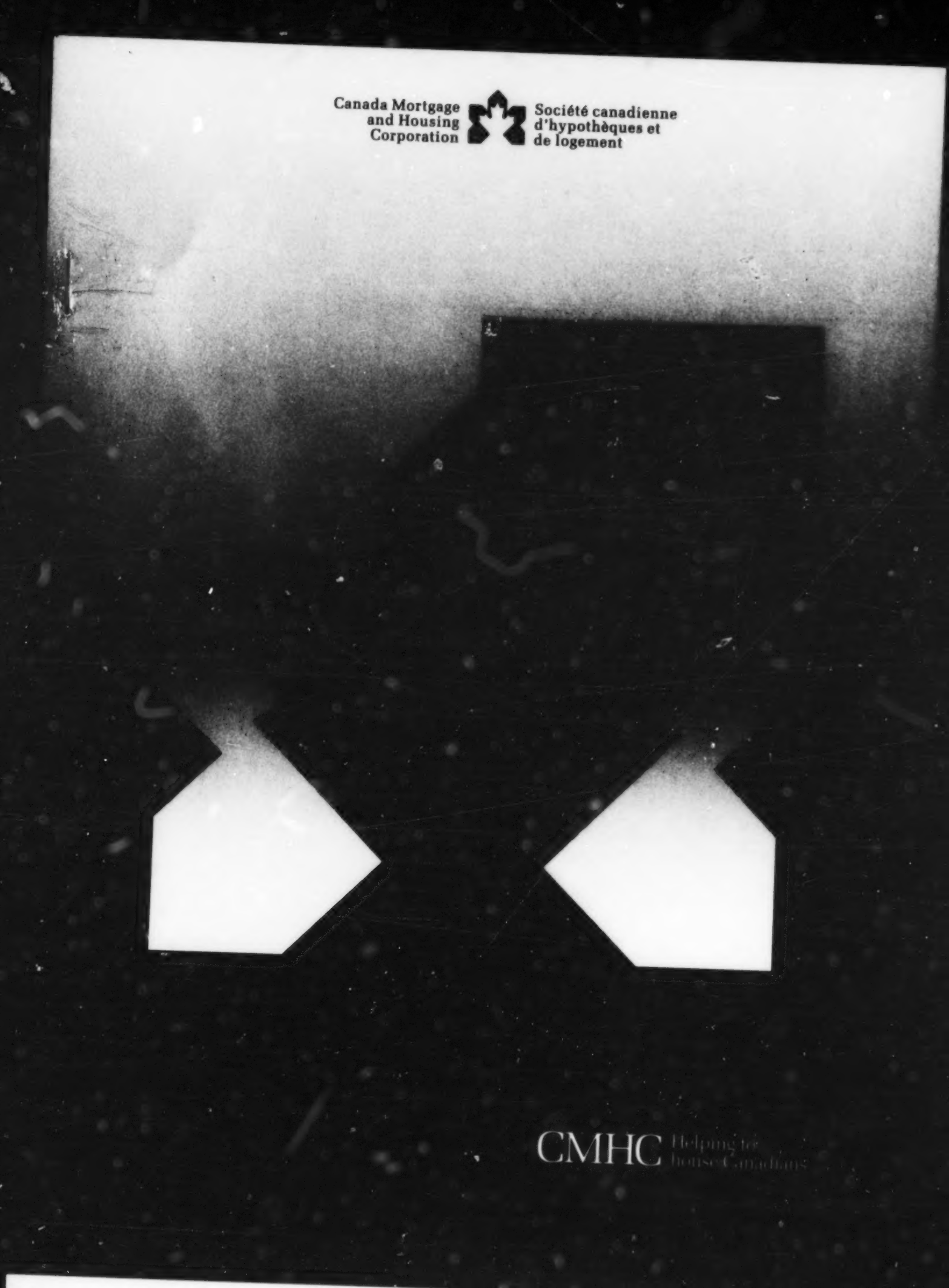

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REPORT ON TRADE EXPERIENCES FOR WOODFRAME CONSTRUCTION AND BUILDING PRODUCTS

Prepared for
Canada Mortgage and Housing Corporation
by
Edwin (Ted) E. Buswell

CMHC Project Manager: Tony Wellman.

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REPORT ON TRADE EXPERIENCES FOR WOODFRAME CONSTRUCTION AND BUILDING PRODUCTS

Introduction

This report will discuss the main factors involved in marketing Canadian low-rise woodframe housing, together with design, engineering and construction expertise, manufactured wood and building materials, associated structural components and equipment in international markets (excluding the United States and Japan).

The approach taken is to relate experiences in the phases of successful market development overseas for wood frame construction and building products. The report then comments on the philosophy involved, methods used, and the lessons learned which could guide future market thrusts, and offer options for discussion.

Information has been drawn from over 28 years of experience, covering the United Kingdom, Western Europe, the Middle East, North Africa, the Caribbean area and East Asia. The retention of international marketing and trade information is fragmented, but, in terms of public access, the federal government Department of Industry and Science has the most comprehensive information. They have been continuously involved in the international marketing (promotion) of woodframe construction (timber frame in the U.K. and Europe -- 2 x 4 and platform frame in Japan) since 1962. The Department of External Affairs also has a history of close cooperation, as do the Canada Mortgage and Housing Corporation, the National Research Council and the Departments of Forestry and Energy.

However much Canadian Governments at all levels along with involved industries and professions and similar in foreign countries contributed to woodframe promotions overseas, the British Columbia forest industry as the B.C Lumber Manufacturers Association (later Council of Forest Industries (COFI)) has done more and steered the operations continuously for three decades.

The cooperation of industry and government in the broadest terms in this endeavor has become a classic example of the benefits of working together with all parties doing the things they do best toward a common goal.

This report does not attempt to detail the work of the COFI but would state up front that all the activity was undertaken with its knowledge and support. Moreover, the Councils' own work was many times greater in quantity and of equal quality. A more comprehensive study of timber frame promotion would require extensive research into the workings of COFI's market development group in Canada and overseas. Its work in Australia and Japan was always coordinated with European and American operations. The roles, participation and results achieved by the above government agencies and the efforts of Canadian industries and companies are comprehended by only a few individuals. There is no organized repository of experience in either government or industry. Similar information gained by provincial governments has not been correlated with other governments and out-of-province industries.

Government trade statistics do not separate out timber frame houses nor do they suggest the end uses of construction materials and equipment. Some industry associations and companies active in the field may have collated information, but these are private data.

This situation has prompted this report, which will attempt to summarize experience, present status and future prospects for the export of Canadian wood frame housing and building products.

The Beginning

Around 1960, the Canadian west coast lumber manufacturers sensed that their most saleable and profitable product was dimension lumber, used for low-rise residential construction (e.g. in wood house framing). They had achieved an appropriate share of the North American market for that product.

To increase sales (i.e. enlarge and diversity the market), it appeared necessary to sell dimension lumber overseas. Encouraging and increasing its use in housing outside North America was undertaken to create demand. The strategy was to sell more lumber by selling wood frame housing in new markets. In later years, more wood products (e.g. plywood, shingles, flooring, trusses, trim, cabinets, doors, windows, etc.) were marketed as parts of houses -- like tires and batteries for cars.

To encourage the construction of Canadian wood frame housing to draw through the products was complex. Preferably, the ideal market location would have most of the following characteristics:

- a business structure which would be easy to cooperate with and be reliable;
- not be too different from Canada in terms of culture, climate, environment and lifestyle;
- a compatible operating wood importing and distribution system;
- a housing need which could be converted into a significant demand for wood frame housing.

Britain was quickly seen as the logical first test market location to explore. As well, before 1960 Canadian house building firms had made sporadic attempts to introduce their woodframed houses into Britain so some of the market ground had been broken.
Subsequently, the next best locations were identified as France,

Belgium, the Netherlands, Germany, Japan, Italy, Korea and China, in that order, over the next 28 years. Many other countries were investigated and discarded, often because of an unreliable business structure or a non-conducive climate.

There have been ups and downs in the marketing experience, often through conditions beyond the program's control e.g. the value of the Canadian dollar vs. European currencies and the U.S. dollar, changes of government and resulting changes in housing policy, changes in key influential persons through reassignment, replacement or retirement, changes in competition as the U.S., Scandinavia and Russia undertook promotional projects or lowered prices, or bad publicity was sustained due to media exploitation of local problems.

Embarking on an overseas promotion program required budgeting of time and money, setting targets and organizing private sector participation.

The time aspect involved a critical path approach toward a sales objective which became a marketing plan which could be discussed and cooperated with by industry and government on both sides (i.e. the demand and supply sides on both sides of the Atlantic).

It was important to plan a sequence of events to suit the policy of establishing a long-term market, as well as encouraging short-term sales which would help to cover the cost of the project and measure its interim success stage by stage.

Prudently, it was recognized that this was a first initiative and that, although there was a long-term outlook, trial and error would guide the many steps toward the goal. A pilot program approach was designed to educate the participants, to prove out methods and allow flexibility as conditions changed.

Getting Started in Britain

Getting started involved selecting suitable management personnel, planners, promoters, market influentials, technical, financial and public relations experts. The members of the resulting team had to be educated about their roles, the objectives they were heading toward and ways and means of achieving them on schedule. The British Columbia Lumber Manufacturer's Association took on the organizational responsibility.

It was necessary to attract the cooperation and support of volunteers outside the industry, both in Canada and Britain. To try to introduce a new house construction system into the United Kingdom meant achieving government support (i.e. educating influentials). Opening doors to them required government-to-government contact and thus involved Industry, Trade and Commerce, Central Mortgage and Housing Corporation and External Affairs in Canada, as well as their opposite numbers in England. Decision makers related to building codes and materials standards who were working in the National Research Council, Canadian Standards Association and Mortgage Lenders and Underwriters Laboratories had to be identified and enthused toward cooperation.

Such liaison was often delicate. The whole program had to show an advantage to British housing policy and a way to meet housing needs efficiently, economically and credibly. There was no room for any suggestion of blatant commercialism. On the other hand, cooperation with the British Timber Trade was commercially important so that business with British importers had to be enhanced and profitable.

The managers were always guided by the direction of the industry guided program and the availability of the resources of cooperating private and public sector organizations in supplying personnel, money and time. They organized what was to be done in detail -- by whom, when, where and at what price.

SUMMARY OF CANADIAN TIMBER FRAME HOUSING PROMOTION IN THE UNITED KINGDOM, 1960 - 1964

All of the foregoing took approximately three years and cost a considerable amount of money without any major return. It was an investment toward establishing a market, the results of which began to show up positively from 1965 onward. The process overviewed in this report shows, by an early example, how Canadian timber frame construction was introduced into an overseas country. It also indicates a philosophy and method which has been effective in approaching other new markets.

As a result of following the procedures outlined above, Sir Donald Gibson, Director General of Research and Development, Ministry of Public Building and Works (U.K.), led an official mission to Canada in 1963 to study the possibility of Canadian timber frame housing methods being applied in Britain to alleviate the developing crisis in meeting housing needs. He wrote the foreword for the Canadian Department of Trade and Commerce brochure "Canadian Demonstration Homes - The Essentials of timber frame Construction", and quoted from the mission report addressed to three cabinet ministers involved in British housing.

He recommended to the Canadian government

> "that it would be a good idea if they should build a few of these (timber frame construction) houses in our country....The Canadian government accepted our invitation and has now built two housing units at Sighthill, Edinburgh, two in Lancashire at Up Holland and two at Abbots Langley just outside London....When the Canadian demonstration homes were opened to the public during the last week of October and the first week of November, 1964, thousands...came to visit them....There is no doubt that timber frame houses can be built more

quickly than our masonry construction and there is reason to believe that they can also be built for less money. To test this theory pragmatically, we are thinking of a larger building project in the future, comprising some 200 Canadian-type houses in a single development."

Note: the larger development became known as the Harlow Project.

A further foreword from the same brochure made the following interesting statements:

"The project was undertaken by the Canadian government in cooperation with national and local government authorities in Britain to demonstrate the timber frame construction system. It has the support of the Timber Trade Federation of the United Kingdom."

"Central Mortgage and Housing Corporation - a Canadian Crown corporation - was responsible for the planning, design and construction supervision of the project. Cooperation was received from Canadian timber trade associations and individual Canadian companies. Their names are listed in the directory of suppliers at the back of this booklet."

It should be noted that Lumber Manufacturers Associations from all over Canada contributed wood products and non-wood companies (e.g. Alcan, Domtar, Emco, Monsanto, Weiser Lock, Canadian Westinghouse and General Steel Wares) also contributed products. Materials were purchased from thirteen more Canadian building material suppliers of furnaces, doors, windows, hardware and appliances.

Note: The inclusion of as many Canadian products as possible in demonstration houses subsequently built in many countries has been encouraged by the Department of Industry and Trade and has been a standard feature.

The brochure illustrated the timber frame construction technique stage by stage with a profusion of photographs. Thousands of copies were distributed to appropriate influentials throughout Britain and were presented to visitors to the demonstration homes. It was a key public education tool.

At the very beginning, the Canadian government sought to include as much Canadian content as possible, other than wood products, in the timber frame demonstration homes as a means of introducing Canadian products and companies to an export market. This has been a continuing policy and has encouraged many building product suppliers to get involved.

The introduction of Canadian timber frame housing into the U.K. was a success story. It served as a pilot project, the elements and philosophy of which have been refined, expanded and reused successfully many times.

Timber Frame: 1965 to 1975

The decade from 1965 to 1975 saw an unprecedented expansion of timber frame promotion which introduced the system throughout Western Europe and started action in Japan.

The British Columbia Lumber Manufacturers' Association (BCLMA), now the Council of Forest Industries of B.C. (COFI), established a European headquarters in London, England, staffed with architects, engineers and product specialists. Branch offices were established in Paris, Brussels, Utrecht, Aachen and Rome. Timber frame housing was promoted cooperatively with Canadian government

departments as in Britain, but was fine-tuned according to local considerations. An important aspect was that high credibility was maintained through professional level presentation of technical information in an educational, rather than commercial, context.

Good commercial results were realized. As timber frame houses increased in number and popularity, a new British industry developed to produce whole house component packages for motor truck delivery and site erection by builders. The manufacturers got their know-how from North America and used Canadian wood products almost exclusively. The British market used as much B.C. wood as Canada in the early 1980's, and also bought substantial amounts of lumber from Scandinavia and Russia.

The decade to 1975 had a number of other highlights.

The Parc des Erables Project of 114 timber frame houses built at Igny, close to Paris, in 1970 was the next major initiative. It was designed to expand Canadian content beyond wood products. Campeau Corporation became associated with the Dumez Society to assemble and develop the land, and to design, build and sell the houses. Thus a Canadian builder was involved, Canadian techniques and materials were used and a model Canadian community resulted.

The French housing authorities accepted by "agreement" that Canadian timber frame construction was a "traditional" method. This acceptance was important recognition in Western Europe and North Africa. Hundreds of housing officials, professionals, builders and labour representatives from all over Europe inspected the Igny site, as well as thousands of potential home buyers. A CMHC engineer was on-site from beginning to end to record construction progress, answer technical questions and catalogue visitors' reactions.

Canadian house designs with open floor plans, built-in closets and basement recreation rooms outsold traditional French designs four to one and all 114 units were sold quickly.

Coincident with the Igny project, the B.C.L.M.A. representatives in Paris, Brussels, the Hague and London cooperated effectively in holding technical seminars, selecting influential personages to get V.I.P tours of the site and organizing the supply of Canadian wood products to builders who wanted to start building timber frame houses.

Two major U.S.A. house building companies, Kaufman and Broad, and Leavitts (Leavittown's) also promoted timber frame in France at the same time. They benefitted substantially from the Canadian acceptance initiatives at Igny. They had the same problems operating as land developers and selling houses as Campeau experienced and did not establish continuing business. Canada established a timber frame market albeit with French builders and supplied lumber and plywood and other building materials e.g. roof truss materials and cabinets.

During construction of the Igny project, a detailed photographic record was made. A typical component plant was set up off-site to supply trusses, etc. to demonstrate that technique. Time and motion studies on many operations produced learning curves to indicate how long it would take for completely inexperienced labour (i.e. Algerian and Spanish) to do subtrade work with reasonable efficiency. All of these data were organized by ITC officers in Canada and the results were published in a series of booklets in two languages. Technical reports were produced for Europeans and others for Canadian builders and suppliers.

Tens of thousands of the European editions were distributed by mail and at international trade fairs during the next five years. At the same time, the photo record was organized into slide shows and onto audio visual cassettes. The latter were distributed to Canadian trade

offices worldwide in five languages. They were in great demand to support timber frame construction seminars, to instruct architectural and engineering students, professionals and builder associations. Significant numbers found their way to the Middle East, North Africa and South America. These promotional tools derived from the Igny project were economical and potent spreaders of the viability of timber frame construction concepts. The public relations program engendered great interest, especially in Belgium and the Netherlands, where housing officials, professionals and builders were soon asking for personal experience with the system. They began forming groups to visit Canada on study tours.

One such group from the **Netherlands** composed of architects, building officials and local authorities returned home to set up a national architectural competition. Six municipalities offered land and guaranteed to build, under the winning architect's supervision, a design for appropriate timber frame housing as a mix of single and multiple units. Most of the leading architects, about 130 in the country, proposed schemes and, over two years, the projects (300 units) were completed. They were internationally visible. Some architects visited Canada to refine their structural use of Canadian lumber and plywood. Some Canadian expert tradesmen were recruited to teach and supervise local construction company crews. Home builders, tradesmen, code officials and home buyers all got in-depth experience with first class timber frame construction. Several of the builders became timber frame specialists and have since built thousands of houses. One company president often appeared as a strong supporting speaker at Canadian timber frame seminars in other countries.

France and **Belgium** went their relatively independent ways. In both countries some moderate sized home builders experimented with timber frame construction and found it to be fast, saleable and profitable The builder's success had two sides. They tended to pocket the extra profits available from timber frame housing which

encouraged more and larger developments but by not passing on savings to home buyers the house product did not show the economies that housing authorities wanted and had anticipated. From 1975 to 1985 their operations grew steadily in size and numbers to produce about 15,000 units per year in each country. Throughout, the Canadian trade officers and COFI technical representatives supported and encouraged the builders, the professionals and the authorities by participation in international trade shows and educational missions to Canada.

In Britain, and later in Europe and Japan, timber frame house construction was taken over by resident entrepreneurs. Canadian builders showed little interest in the export market. Most considered it too much of a long term commitment in terms of money and personnel and too difficult in terms of building codes, architectural supervision and guarantees (up to 10 years). In Europe, a builder was a builder and did not participate in land assembly and development nor architectural design or marketing. Hence, the profits available to Canadian developers in Canada were not accessible to them in Europe. This was discouraging.

In early days, the B.C. lumber and plywood industry was the main benefactor because of its large and continuous promotion. In a very quiet but potent way it contributed internationally to Canadian timber frame house construction expertise and was paid back handsomely by overseas market expansion for its products. Through the years, original sales targets of 100 million dollars a year have grown to become 2 billion actual sales each and every year outside North America. Most of the market expansion has resulted from the timber frame housing programs described above. Even now (1989) similar techniques are being used to open the Chinese market.

In 1971 Canada hosted the *World Consultation on the Use of Wood in Housing* for the Food and Agriculture Organization of the United Nations. Canadian leadership in producing wood frame housing was

promoted worldwide as foreign country participation in the Vancouver meetings was encouraged by Canadian embassies and proceedings of the conference were written up and distributed. Canadian prominence in this work was established.

The consultations emphasized the housing needs of third world countries i.e. basic shelter in warm climates at low cost and local labour intensive. During proceedings it become apparent that industrialized countries including Canada could supply helpful materials, equipment and technology but not the necessary low prices. Whole houses were even more out of the question. United Nations organizations have not been able to find solutions to the transfer of housing from the haves to the have nots and so although Canadian timber frame concepts and material could help to meet world housing needs they have not been applied except in the odd emergency disaster situation.

In later years it has been observed that United Nations organizations can be customers in their own right as they supply housing to their staffs. Often such accommodation is rather special, being of good quality designed for the comfort of Europeans and Americans in hot third world areas.

The year 1972 saw demonstration homes built for the *Canadian Embassy in Tokyo,* with the guidance and support of COFI. This was a high profile project which yielded extraordinary international publicity. As for the Igny project in France, the Canadian government produced reports and audio visual programs to publicize the Japanese project worldwide. It started the flow of technical missions to and from Japan. The formation of the **Canada-Japan Housing Committee** followed in 1974, providing a vehicle for the exchange of housing policy information and 2 x 4 construction technology. Canada Mortgage and Housing Corporation often provided the Canadian chairman and HUDAC was usually represented at annual meetings.

Meanwhile, the Canadian modular home manufacturing and industrial camp industries were developing their products from mobile homes into three dimensional transportable homes of traditional timber frame construction.

The Canadian manufactured home industry benefited from the Canadian government's timber frame promotion work in export markets because access for the construction system had already been achieved or was being worked on. The industry was being kept advised of export opportunities and investigated them through the **Program for Export Market Development (PEMD).** One of the first opportunities investigated was Israel, where demonstration houses were later set up. Similarly, **the lively Middle East market** soon showed sales in Saudi Arabia, Iran, Lybia and Algeria where modular housing was set up for living quarters for expatriate workers around new harbors, desalination plants, liquified natural gas complexes and oil processing communities. More than 10,000 units were delivered, as well as hundreds of construction camp dormitories, kitchens, clinics, schools and geophysical stations. The year 1976 was important, but previously (in 1973) the Canadian Home Manufacturers Association presented their Industry Award to the Resource Industries and Construction Branch of the Department of Industry "for its substantial contribution for the benefit of the industry in Canada".

In 1974, after two years of research, the Department of Industry published the "*Export Opportunity Survey for the Products of the Canadian Manufactured Homes Industry*". This survey looked at 127 countries and rated the quality of the opportunities in each on a scale of ten. Perhaps more importantly it demonstrated a method of market analysis and provided a format within which information could be cataloged, updated and compared. It was designed primarily to indicate where and why Canadian housing products could be promoted. Copies were distributed throughout the Canadian home building and manufacturing industries, to schools and libraries, to financial and transportation organizations and

around the world to Canadian Embassies. Although the conclusions of the survey were a snapshot of world markets, they provided a benchmark to gauge the value and amount of changes through succeeding years. The survey helped to introduce the concept of international marketing to many smaller Canadian manufacturers and builders and indicated the assistance available from the Canadian Government. The bibliography listed helpful sources of housing data provided by United Nations organizations.

Progress After 1975

The Department of Industry, Trade and Commerce published a trade paper, "*Canada Courier*", in which export success stories were described. Circulated in Canada, it encouraged export thinking. Abroad it highlighted successful Canadian products. In 1978 it featured the Canadian Manufactured Housing Industry. The Spanish language version alone generated over 500 foreign inquiries. The Department replied directly with a list of suppliers; it passed on the inquiries to appropriate companies and advised Canadian foreign trade officers overseas so that the validity of the inquiries could be checked. This chain of events was repeated several times. As well, the Department canvassed the industry and assembled manufactured housing product literature from more than fifty export interested companies. Kits of files were sent to appropriate embassies overseas to educate the trade officers about company capabilities, experience and products and to give them reference promotional tools to use in business and educational meetings.

For a few years there was considerable activity between western Canadian home manufacturers and Spanish speaking developers in the Caribbean, Central and South American countries but foreign economic conditions e.g. rampart inflation, lack of hard money and a "buy-within-the-area" policy made business difficult. Little of substantial benefit has endured.

Through the years, Canada was a "national" exhibitor at many **major international building product trade shows.** These projects were operated by the **Fairs and Missions Branch** of the Department of External Affairs. Often, the exhibits housed six to twenty company exhibits promoting their housing products. The Department of I.T.C. usually enlisted the exhibitors and guided them with market data. The exhibitors were financially assisted and met high standards of participation, such as providing product literature and representation capabilities in the language of the area. On numerous occasions, the Canadian stand had a timber frame housing theme, with the majority of exhibitors offering products involved in house building that were not confined to wood products. Home manufacturers have advertised their know-how and sought distributors. International shows with regular Canadian participation occur regularly in Birmingham, Paris, Brussels, The Hague, Hanover, Hamburg, Munich, Milan, Bahrain, Jedda, Cairo, Tokyo and Mexico. Shows generally help to improve a company's position in a market, rather than introduce it to the market. The "Fairs" program is ongoing, which attests to its efficiency and value. Trade officers manning the exhibits are listening posts who report their findings and provide first-hand market intelligence.

Likewise, **trade missions** to and from Canada have been (and are) the responsibility of the Fairs and Missions Branch of External Affairs. The assembly and operation of a mission concerned with timber frame construction is handled by the Industry Department. They structure a trade mission from two points of view: to give visitors the information they want or need to do things which will advance Canadian housing related export business; and to give Canadian cooperators experience with foreign buyers, housing authorities, builders, designers, and journalists toward gaining insights which will assist them in participating knowledgeably in export activities.

Each year, groups of foreign influentials came to Canada to have their confidence in timber frame construction raised and to seek

sources of Canadian supplies including technical knowledge. They were invited to see factories and site home building across the country, with the cooperation of CHMI and chapters of HUDAC - CHBA. Regularly, they stopped in Ottawa, Toronto, Calgary and Vancouver and often visited Kitchener, Halifax, Montreal, Saskatoon, Edmonton and Prince George, where local builders organized meetings and housing tours related to their operations. The government provided interpreters. These missions have been effective promotional tools.

Similarly, but less frequently, groups of Canadian experts and building product exporters were formed into missions to tour foreign markets, presenting seminars and visiting production facilities. Once again they were two sided projects -- giving information and receiving experience. Britain, France, Germany, Italy, Greece and Japan were targeted. As well, Canadian trade officers world wide were trained and encouraged to seek opportunities for timber frame related products.

The performance of timber frame houses subjected to **fire and earthquake** hazards has been an important recurring concern of overseas housing authorities. Incoming missions have been appropriately routed through seminars with the Canadian Wood Councils's Fire Research Group and NRC's Earthquake and Building Code Divisions. NRC also covered acoustical concerns in multi-unit construction.

Incoming technical missions regularly visited **high density multi-storey, multi-unit developments** such as the Toronto Housing Commission projects e.g. St. Lawrence Market and False Creek in Vancouver, to impress them with the capabilities of timber frame construction in inner city housing and Canadian confidence in its fire performance. The management of those complexes cooperated fully with seminars and guided tours by the designers and builders.

Every timber frame oriented mission, incoming or outgoing and every trade fair and seminar was arranged with the knowledge, guidance and support of the **Council of Forest Industries of B.C.** Their representatives participated in the selection of members and their itineraries and agendas. These representatives all lived in their market area, spoke the languages required and were trained and knowledgeable in the nuances of business, government and social relationships. They often travelled with missions and seminar tours. The council provided large quantities of technical literature, product displays.and tours of mills, forest operations and transportation facilities. From the Vancouver head office, they annually ran ten to twenty incoming tours of west coast timber frame and wood production complexes on their own. Those were mainly Japanese groups. As well they set up carpenter training projects for Japanese construction foremen and the Canadian government issued diplomas. COFI developed a world wide reputation for the excellence and credibility of its technical services and influential business and government contacts.

For the last ten years, the international interest in **energy efficient housing** and energy conserving construction techniques and materials has given Canadian timber frame construction another reason to claim leadership. In structuring itineraries and agendas for incoming technical missions, the Department of Industry has included sessions with Canadian energy experts and authorities and tours of R-2000 homes both completed and under construction. The Building Research division of NRC in Ottawa, Vancouver, and Saskatoon, the Saskatchewan Research Council, the Carleton University Faculty of Architecture and the Department of Energy Mines and Resources Canada have hosted and been involved in educational meetings.

Similarly overseas, Canadian energy experts along with builders and home manufacturers have been featured on seminar tours in Germany, Italy, France, Belgium, Greece, Japan and Korea. Through EMR, Canada participated in the British Lifestyle 2000 project of the

Energy World Exhibition in 1986 and received much favorable publicity for Canadian R-2000 standards throughout the United Kingdom. CMHC, NRC and EMR experts, as well as provincial and university counterparts, have been in constant international consultation on energy concerns, often related to experience and research with Canadian timber frame residential construction.

The expertise and experience of major power commissions (i.e. HEPC of Ontario and other energy source organizations) have also been involved when their special information applied.

The viability of timber frame construction overseas depends on its marketability. This report has touched on many factors involved in making the house product acceptable, desirable, in tune with customs, traditions and lifestyles, architecturally appealing, structurally sound, durable and a good financial investment. To assist in getting the last message across, foreign bankers, mortgage authorities, quality surveyors and insurance executives have been selected to come to Canada on numerous missions and have met with counterpart experts and real estate company directors. Similarly Canadian architects and businessmen have discussed Canadian marketing overseas. The marketing section of the R-2000 manual is beginning to be consulted.

Timber frame modular housing has responded to housing needs resulting from wars, natural disasters and economic booms. Thousands of transportable, three-dimensional units have been shipped overseas. They have been accepted because the overall marketing program has preconditioned decision makers with confidence in the structural adequacy, comfort and economy of timber frame units. As well they were eminently transportable, quickly available and backed by Canadian reputation.

The foregoing brief overview has made several points. Specifically, that Canadian timber frame construction for residences has been

hugely successful as a means of drawing through the export of Canadian building materials, products and equipment into overseas markets.

The marketing methods devised early in the 1960's have been refined and extended and become ever more potent. After three decades they are still being applied and yielding profitable results.

The timber frame construction marketing concept has built worldwide credibility for Canadian initiatives and operations in both government and commercial circles.

Through the years, there have been thousands of high level housing authorities, building officials, professors, building professionals, builders and journalists from Canada and abroad who have participated strongly and voluntarily. They along with Canadian government trade officers, formed a network of knowledgeable cooperators whose influence has been invaluable and it is still potently available and operating.

Throughout the timber frame construction campaign Canadian industry has been informed and involved. The Department of Industry has consistently encouraged home builders and building product manufacturers and their designers and suppliers to investigate and participate in export markets.

The Canadian government and now, several provinces, have in-depth export marketing information and proven marketing tools and assistance programs in place and available to assist businessmen to assess international opportunities and devise marketing strategies. However, their information and advice is "general" so individuals, groups and companies must take the initiative to enquire and determine what is useful in their particular situation.

Program Support Items and Services

In most housing markets outside Canada, timber frame construction has had to achieve regulatory acceptance in the face of competition from established domestic sources of home building materials and the resistance to newness and change by officialdom and bureaucracy. Timber frame had to prove its superiority and trustworthiness in terms of wood as a sound and durable structural material that is economical for housing.

Dimension lumber for structural uses had to establish itself as being consistently produced in terms of sizes and quantities and uniformly graded to fit internationally recognized standards of strength and quality. To assist in presenting Canadian lumber as satisfactory to approving authorities in foreign countries, the producing industry worked closely with the **Canadian Forestry Service**. Both the Eastern and Western Forest Products Laboratories cooperated extensively by supplying appropriate literature and the services of engineers, researchers and scientists dealing with the strengths and properties of Canadian woods. The Lumber Standards Committee of the **Canadian Standards Association (CSA)** was able to help by making grading rules comparable in the International Standards Organization context.

Similar cooperation from the same sources was required, and was successfully used with respect to the acceptance of plywood, shingles and shakes and other wood building products and assemblies, such as trusses. There was a long struggle to gain approval of Canadian Douglas Fir plywood against German DIN standards.

Unfortunately, each country had its own array of vested interests and officials who had to be convinced. They were not often swayed by neighbors' acceptance, even in the European Common Market. Speaking of vested interests, the size and direction of influence can be gauged when in 1985 it was estimated that the British brick and

block industry lost or gained £ 100 million with each 1% change in the percentage of timber frame annual new housing starts.

Beyond the acceptance of the building materials, the wood frame houses had to be approved, not only in terms of building codes and regulations, but also in terms of mortgageability, insurability and livability.

The codes and standards aspects were assisted by international respect for the Canadian National Building Code, especially Part 9. Hundreds of copies of succeeding versions of the Code were distributed to appropriate officials for comparative study. **The National Research Council, Division of Building Research** cooperated by conducting seminars on the structure and authority of the National Building Code of Canada and provided literature and expert advice on fire, earthquake, acoustical, humidity and wind resistance concerns. The **Canadian Wood Council** also contributed publications and expertise on the fire performance and structural uses of wood and wood fastenings.

Central (Canada) Mortgage and Housing Corporation contributed effectively and consistently throughout the country-by-country struggle to gain acceptance of wood frame housing. The Corporation's international reputation for integrity and knowledgeability made its support authoritative and valuable. Its publications were used extensively, especially the wood house construction manual (of which many thousands were distributed). Translations by overseas scholars provided Japanese, German and Italian versions. CMHC statistics provided authoritative information for foreign influentials concerned with demographics and the kinds, numbers and locations of Canadian houses. Most of the Corporation's cooperation was contributed within Canada and it made financial arrangements for its participation overseas.

The Canada Department of Industry, Trade and Commerce (and its other names) was the organizer and coordinator of most of the above and also other contributed goods and services. As an example, in 1985 it undertook to assemble and distribute several hundred Mini Libraries. These were packages of Canadian publications, as mentioned above, which were sent to Canadian Embassies (about fifty) overseas. Each country received from five to twenty libraries, which were subsequently presented with some ceremony to selected universities, professional associations and government departments. They will be kept updated.

Overseas, the trade officers of **ITC and External Affairs** worked with dedication. They identified influential people and organizations, organized missions, participated in trade shows and professional level seminars and the distribution of literature. As well, they became useful advisers to Canadian businessmen and experts concerned with the marketing of wood frame houses and building materials wherever the program was being promoted. They helped to spread the program as they moved to new posts. As they accompanied foreign groups to Canada, they improved their Canadian background and consolidated their foreign contacts and positions.

The Secretary of State Department was also involved by providing translation and interpretation services. Canadian technical papers prepared in English or French were translated for publication in Japanese, Korean, German, Polish, Italian, and Spanish. As groups travelled in or out of Canada multilingual interpreters were assigned to them which made communication possible.

This outline points out the size and complexity of the international wood frame housing program, which has developed over almost three decades using mainly contributed resources. However it should be recognized that at no time did the Canadian government dignify its many involvements as being a "Program".

Add-on Markets

The message that millions of Canadians are well housed and enjoy a comfortable lifestyle in attractive, efficient timber frame houses has been received and believed, often through timber frame promotion. As in Canada, the public overseas assumes that, if housing authorities accept the structural system and mortgage and insurance rates don't penalize it, it is a safe investment. Beyond that, what makes Canadian timber frame housing attractive are improved living features that can be built into it or are promoted as part of it e.g. temperature and humidity control through construction and central mechanical systems, ventilation control to reduce dust and sound problems, ease of achieving innovative interior layouts, efficient kitchens, comfortable family rooms, glamorous bathrooms and commodious accessible storage.

An interesting statement which often surprised and impressed foreign audiences is that 100 million people around the world live comfortably, securely, and economically in timber frame houses.

The image of timber frame housing abroad has been established as upper middle class, which means that modern living features and decoration are part of it. Some certainly are, since they fit best into structures with trussed roofs, basements, cavity walls and joisted floors. However, in foreign countries, there is often a lack of domestically produced products to fit timber frame construction or its image.

The building of timber frame housing abroad opens market doors for all kinds of house parts, equipment, tools, appliances, floor treatments, fenestration, furnishing, furniture, cabinetry and decorative items. North American movies and magazines pre-sell concepts of "the good life". A few Canadian manufacturers of lifestyle products have hooked into timber frame promotion advantageously, but there is room for much more entrepreneurial

activity in this field. Exported house packages should be equipped with Canadian accessories. Often products can be exported as parts of houses more easily than on their own.

A number of internationally oriented companies especially in the plastics field, market North American products, which can be, and are, being adjusted for European service. Insulation, sealants, paints, siding, shingles, wiring, and carpets are examples. Such products have been drawn through where wood frame housing is following the modern trend to more sophisticated energy conserving construction.

Expertise offers another kind of add-on market. In early days, tradesmen expert in the installation and finishing of gypsum wallboard were used to instruct and supervise domestic laborers. Similarly, electricians, plumbers and heating and ventilation experts have taught the most efficient ways to install services in timber frame construction. Canadian project managers and construction superintendents have supervised multi-unit projects. Often these people were involved through the recommendations of the Canadian industry timber frame promoters.

Similarly, Canadian architects who have cooperated in mission and seminar projects have made international contacts and secured offshore commissions. Scientists, educators, engineers and businessmen have found similar opportunities and have gained monetarily and in terms of experience and prestige. As well, overseas professionals have sought opportunities to visit Canada to observe our methods, evaluate our standards and materials and establish liaison with sources of information. These exchanges have been between both government and commercial organizations and between individuals.

Canadian participation has consistently involved CMHC when related to housing statistics, demographics, financing, social policies, housing for the disadvantaged and materials evaluation. The Division of

Building Research at NRC has liaised expertly on building codes, acoustical and earthquake design and fire research. Energy, Mines and Resources has contributed internationally to residential energy use research. All of this action has a reciprocal side and Canadians receive in proportion to what they give in terms of exchanges of expertise and data. Very little of such information has been bought or sold and a sort of barter system operates.

Financing

The overseas marketing of Canadian building products, especially wood products, through the promotion of timber frame housing, has been a very strong and very successful cooperative effort between industry and government. As indicated in the introduction of this report, from the beginning there has been a joint effort based on the realization that success was good for Canada. It increased foreign trade, generated good relationships between industry and government in Canada, and between them jointly with their opposite numbers in individual countries in the United Kingdom, Western Europe, the Middle East, North Africa and the Pacific Rim. The prestige of Canadian government involvement facilitated the presentation of Canadian concepts and interests which were/are industry interests to educational and regulatory institutions at highly influential levels. The Canadian flag always offered credibility and prestige to public-oriented endeavors such as trade shows.

No one has attempted to put a price on Canadian government services contributed to the timber frame cause, either annually or in total, but it would be substantial. The price would probably rank with the general government cost of promoting other Canadian commodities, products and resources, such as wheat, fish, atomic energy plants, films and tourism.

What has made the financing of the promotion of wood frame housing internationally unique is the long-term commitment of the west coast lumber industry, both philosophically and financially. The industry has taken the lead and sought support on its own initiative.

Direct government financial support was formalized about fifteen years ago under the **Cooperative Overseas Market Development Program - COMDP.** The program is funded through equal contributions from the industry, the province of British Columbia and Canada. The province and the country are relatively silent partners with the Council of Forest Industries of B.C., which directs and operates the activities while offering budgets, plans and progress reports for review. The program runs within five year contracts and spends more than three million dollars annually.

The COMDP program has been very successful and, recently, a similar operation has been organized in Eastern Canada, but it has not made the promotion of wood frame housing its major initiative. Although it would appear that COMDP type programs could be useful for other industries, it has been difficult to find an industry with a long-term single-minded approach to international marketing, which is the major industry of a province, has export experience and is willing to commit adequate financial resources.

Indirect support for the wood frame house cause has been generous. Very little actual money has been involved, but significant contributions of time and services have helped to make the program work. Across Canada, cities, universities, companies, utilities, industry associations of various kinds and professional individuals have participated on a voluntary basis. Similarly, there has been a valuable response from similar organizations overseas. The program has drawn almost patriotic support in Canada and has drawn foreign support because of its potential for improving the possibility of a credible housing alternative.

Competition

Other than Canadian timber frame construction in the international market, there are competing organizations in Sweden, Britain, the USA and Japan which build houses beyond their borders. Companies which started with North American technology now compete and are acknowledged to have advanced building and marketing techniques. British builders have expanded into Canada, the United States, the Bahamas and Nigeria and were very active in the Middle East. Sweden offers serious competition in Europe. Likewise, the United States is a main competitor in Japan and Central and South America. Japan is likely to use its high-tech housing manufacturing capabilities to sell plants, know-how in China, South East Asia and South America for houses, building materials, equipment and expertise. Korea may be both a market and a competitor. It has wide experience in exporting high-rise residential construction operations based on concrete and steel.

Scandinavian and Japanese house manufacturers have started operations in Canada but have been unsuccessful in introducing their proprietary structural systems even though they used Canadian materials and met Canadian standards.

Large British firms have become well established in the USA and Canada as housing developers in major cities. They use local materials, labour and designs. Their main contributions are money and organization. Similarly, some Canadian developers operate successfully in the USA. There is very little export of products involved.

Germany has a well-established manufactured home industry which uses a modified heavy timber post-and-beam type of construction. This competes with their more traditional masonry and concrete systems. Germany had to produce a great amount of housing after World War II and they developed prefabricated panelized concrete

multi-unit structures. Under emergency conditions, the product was acceptable, being fast and inexpensive. Later, when the country recovered economically, it became socially unacceptable. They sought to export their concrete plants and technology to third world countries and promoted their ideas through the World Association for Element Building and Prefabrication based in Hamburg. Canada made strong contact with the Association promoting the advantages of timber frame housing with and through its membership. Canada provided a Canadian German architect to the city state of Hamburg for a year to prepare plans and specifications based on Canadian timber frame technology and materials for an inner city complex of 65 row houses. Canadian builders were asked to bid but none did and the project was done by German contractors.

In other locations in Germany, Canadian timber frame construction got a good reception, but there were problems in getting code acceptance of materials (i.e. plywood), and market acceptance of what was considered very light weight construction. The multitude of approvals required to build a home was an administrative nightmare for Canadians. Attempts to build with German partners and/or sell through German agents were only marginally successful.

Non-tariff barriers to lumber, plywood and timber frame construction exports have been so troublesome that COFI has reduced its efforts in West Europe in favour of increases toward the Pacific rim. The existing and growing number of foreign timber frame house manufacturers and builders use Canadian materials when they are competitive and come to North America to pick up new technology.

Introducing Canadian timber frame housing into offshore markets has been long, hard work. Countries where timber frame construction was not common obviously had established housing policies, codes, building techniques and labour skills based on the almost exclusive use of other materials (i.e. masonry products such as brick, stone and adobe). From a marketing point of view, mainly

social reasons had to exist for the consideration of accepting timber frame construction as a housing alternative.

Some Third World countries have no residential building code and they and some industrialized countries had no codes to regulate wood frame construction. These situations offered real opportunities to encourage authorities to adopt Canadian codes and standards. There was some success in the adoption of provisions of the National Building Code, but there were never enough Canadian resources of personnel, time and money to take advantage of the opportunities, although useful representations were usually made and welcomed.

A country facing urgent house construction needs often saw masonry construction as slow, wet and labour intensive. This led European countries to give government support to the introduction of the timber frame system, which was seen as relatively fast, dry and producible in factories year round, with less labour cost. Even though timber frame construction helped to ease the European post-war housing crisis, it unfortunately also received a reputation as emergency housing and struggled for regular market acceptance. This has changed in the last few years, as a new generation of buyers and sellers are in the market and new timber frame houses are upscale and competing in the small mansion field. There is always a market niche to serve affluent home buyers who want and can afford to build homes with radical design, innovative structure and sophisticated operating systems.

At present, it is the upscale market that is considering energy efficiency -- not because of lowered energy cost, but because of the sun conservatory fashion and the reduction of sound and dust transmission through better structural design and construction. It seems that there is not a sufficient energy crunch anywhere to pull through energy efficient housing and encourage building timber frame construction to R-2000 standards for specific reasons of economic efficiency and energy conservation.

Future Prospects

In 1974, the Export Opportunity Survey suggested that only 12% of the 127 countries studied holding 17.5% of the population involved offered positive market opportunities for the products of the Canadian Manufactured Homes Industry or more than 80% of the world was negative to market expansion. Without doing an update and analysis, it would appear that the situation has not improved. While there is likely an increase in housing need in absolute terms as the populations of poor countries increase, there is a corresponding decrease in ability to buy Canadian timber frame housing and building products (i.e. demand has lowered as need has increased). Neither Canada nor any other industrialized country has been able to offer affordable shelter housing to masses of homeless and needy people.

The post-war reconstruction period has been lived through so that in most of the western world, house construction is for replacement or for new accommodation for smaller more affluent family and non-family units.

There have been few major developments or mega-projects since the oil associated complexes in the 1970's.

A number of countries with large forest resources in Central America, South America, Southeast Asia and Africa have begun to manufacture wooden building products for export and to supply the beginning of timber frame housing industries. They are becoming competitors and also importers of forestry expertise, manufacturing equipment and house building technology.

Japan has a highly developed housing research capability. They have travelled the world seeking house designs and materials which surpass their native products in terms of lower cost and better performance. Their acceptance of Canadian 2 x 4 or platform frame

construction came after years of research, testing and demonstration house building. Their full scale burn and earthquake tests in laboratories have documented the superior performance of the Canadian system which has thereby gained approval in Japan and provided reference experience to other countries with similar concerns e.g. Italy and Greece

The superior earthquake resistance of timber frame housing as compared to unreinforced masonry, may offer some opportunities for medium-term marketing in earthquake susceptible areas (i.e. Italy, Turkey, Greece and Japan). Previous efforts in this field have gained approval for timber frame construction and Canadian wood products, but have not attracted Canadian home builders to promote their house products as earthquake-resistant.

Comments and Discussion

Remember - the underlying and overriding reason to promote Canadian wood framed housing outside North America has been to sell British Columbia dimension lumber or more correctly to establish new markets and or improve existing ones for B.C. forest products other than pulp and paper. This fact explains many of the choices made in selecting areas for market development. There was no impetus to promote wood framed housing even where there was urgent need and social approval but there was no timber trade in place to buy and distribute boat load quantities of lumber to stockists for the supply of local house builders. The lack of market development in the Mediterranean basin illustrates that point.

The same fact bears on the difference in benefit to the B.C. industry between encouraging established foreign house builders to use Canadian wood framing material to thereby increase lumber imports and supporting Canadian house builders to export Canadian supplied houses using material from other sources. However it was recognized that whoever built "good wood framed houses" increased

the visibility and acceptance of the system and the probability of expanding the demand for local supplies of B.C. forest products.

Occasionally there were some problems with that philosophy as when Scandinavian, Baltic or Russian sources of lumber undercut the prices of Canadian lumber in W. European markets or the Canadian dollar was relatively too strong. This situation encouraged big European timber frame house builders to work with local lumber suppliers to buy European soft woods and have them remanufactured to Canadian sizes and grades to fit their Canadian generated plans and specifications.

The words "good wood framed houses" were emphasized above because the industry and thus the Canadian government was always acutely aware of the effect of "reputation" on the timber frame housing market. They made strong and continuous efforts to encourage builders to build well, using proper materials correctly through informed design and trained efficient labour. It was recognized that timber framing could be easy, cheap, and forgiving of shoddy workmanship and there were entrepreneurs willing to exploit the system and the market for quick profit. There were several results of this situation. Reputable builders were encouraged to build above average houses; foreign codes and standards were often accepted at relatively higher levels than in Canada to assure superior house products when not all builders were familiar with the technology although some architects and construction supervisors were trained in Canada.

The good reputation of wood framed housing was built with great care. It reflected to the house buying public the reputation of the people and organizations involved in promoting it such as the communities or state authorities who approved it; the financiers who mortgaged it, the underwriters who insured it, the builders who guaranteed it and importantly the consumers who bought it, be they private citizens, companies or housing authorities. The buying public summed up all these reputations and generated the

confidence which was far more potent than anything Canadian proponents could offer or achieve on their own.

There was and is a great difference between establishing a long term market for a housing system and one or two time sales of relatively few houses. The COFI commitment was to the long term.

Even the reputation and confidence in timber frame that brought the system to accounting for 25% of annual new housing starts in England and 50% in Scotland was a fragile success. In 1984 after twenty years of progressive advances public confidence was shaken overnight by an ill founded television program which extrapolated a small old poor experience into a national timber frame housing durability crisis. Within a few months English timber frame starts fell to less than 10% and now after five years recovery is only beginning. Strangely the drop in confidence did not seriously affect the rate of timber frame development in the neighboring markets of Scotland and the Netherlands.

That sort of experience has made Canadian timber frame housing promotion very conservative and not prone to introduce state of the art construction technology which although likely to be useful simply does not have a "history" of successful application. New concepts in housing are very difficult to sell anywhere, even in Canada. Traditional housing is universally favoured and changes are very slowly accepted in the mass market. It is a tribute to the obvious advantages of wood framed housing and to the methods of promoting it that it has significantly penetrated European and Asian areas where tradition and conservatism are so very strong.

A point to be made is that in the United Kingdom, Western European countries and Japan there is now ten to twenty years of successful experience with Canadian timber frame housing. The tradition is building up and can be taken advantage of especially now when code and standard barriers to trade between W. European countries are likely to disappear. Several European Common Market countries

have enough experience with wood houses to provide a basis for expansion into neighboring jurisdictions. Their house builders are aggressive. Canadian would-be house exporters might well look at joint venture opportunities in that context.

Although timber frame construction is alive and well in many countries, its identity with Canada fades as local builders produce it in local ways and with local designs, products, equipment and methods. As COFI marketing changes emphasis and moves from Europe to the Pacific Rim, the Canadian push follows. To take advantage of the Canadian identification with timber frame housing which has been built up over one, two, or three decades, immediate action is necessary. It was, is and will be important to build on the goodwill established to maintain and increase the opportunities to influence overseas housing markets.

A recognizable drawback to the acceptance of timber frame housing in offshore markets is the "**orphan syndrome**" whereby home buyers are reluctant to purchase homes for which there is not an established network of guarantees and maintenance sources like a dealer organization for new cars. Only when there is an accumulation of wood framed houses over several years in a relatively small area is there a sufficient demand to support anything like a Canadian lumber yard or do-it-yourself venture e.g. Beaver Lumber or Canadian Tire. This lack of service availability is a real drawback in the early stages of market development but it can offer opportunities for the establishment of retail building material supply centers. If such could offer advice and training on remodelling, renovation and maintenance or offer contracted services, they could develop dependent clientel. As well it has been observed that there is a latent market for tools, both hand and powered, for both builders and home owners.

In a similar way the design of custom grade houses is retarded by the lack of architects with timber frame interest and experience. Most of the timber frame houses built overseas are the products of

large construction companies. They tend to build repetitions of a small number of models which are often ordinary houses using stud walls and trussed roofs. Row houses are even more traditional. There are remarkably few "Canadian" homes featuring openness, family rooms and basements. An overseas "design center" for the education of professionals, builders and home buyers toward new lifestyle homes could be a new thrust into maturing markets. The design center concept could easily and advantageously be extended to offer authoritative guidance to regulatory bodies as well as the publics previously mentioned relative to technical considerations involved in:

-basement foundations, including wood basements
-controlling air changes
-energy conservation
-renovation of obsolete structures.

Most overseas market do not have experience nor access to reliable up-to-date information on those and other topics which are associated with modern timber frame housing. Both professionals and laymen, builders and buyers are vaguely aware of the benefits - those who have been to Canada are enthusiastic - but there is no local sources of advice which deals with the quality of life as well as the engineering of the structures.

If design centers were promoted and perceived as "Canadian" with national government, industry and association sponsorship they could achieve the credibility and usefulness which would open wide doors to previously unexplored markets. COFI went "out" to offer structural advice on the use of its products but did not invite people "in" to hear of the advantages of modern Canadian timber frame houses and how to achieve them using proven design and other than wood building materials and equipment. A design service center housed in a permanent demonstration complex or if there were a series of them it (they) could make a significant impact.

A surprising number of timber frame influentials visiting Canada to study the system raise a question about the ability of Canadian forests to provide a long term supply of suitable wood construction products. They have been assured that Canadians are aware of the demand on their forest resources and are actively preserving and increasing them. It can be pointed out that wood used in the construction of houses is not wasted but serves with undiminished efficiency and increasing value for decades, even centuries. This is in contrast with wood fiber used for fuel, pulp and paper, sanitary products and packaging which use the forest production once and immediately.

As well the construction forest products industry has assisted in developing products and structural efficiencies which reduce the lumber demand e.g. smaller sections, wider spans, plywood, chipboard, gluelam, wood preservation and favouring the use of asphalt shingles.

As well, the B.C. province and industry are leaders in forest protection research and application e.g. selective cutting, reforestation, fire fighting and pest control all of which fight natural depletion and encourage the renewing of the resource.

It has been common for overseas timber frame house builders to try to buy their lumber and plywood direct from Canadian mills and by-pass the timber stockists in their own country, in an effort to reduce their costs and provide higher profits on their houses. The Canadian industry is united in rejecting such approaches contending that huge bulk shipments through established wholesalers give the builder the widest selection of material from on-hand supplies at the lowest prices which are referenced to world wide commodity marketing. This applies mainly in Europe. In Japan some multinational companies have a sufficiently large and growing need of Canadian wood to allow them to buy and operate Canadian mills for their own exclusive use.

Overseas timber frame builders are prone to tie the price of their house products to the price of the framing lumber and plywood and to proclaim that their house prices reflect the cost of Canadian lumber or the quality of it. Few will admit that the framing lumber component of a house is usually about eight percent of the selling price and that that cost is very stable. When land, overhead and profit usually amount to 60% and 50% of the remaining 40% is labour it is easily seen that the timber component is not the most rewarding place to look for cost reduction.

Present international market conditions pertaining to housing are continuously being evaluated toward identifying "fits" between market opportunities and Canadian products. The federal departments of International Trade and Industry are continuing their long standing successful cooperation and provide Canadian exporters with up-to-date market data and guidance. The Industry group is responsible for generating export enthusiasm and participation within Canadian companies and industries. This report has detailed the experience and many resources which they can bring to bear on housing related export opportunities.